

VPDES PERMIT FACT SHEET

This document gives pertinent information concerning the reissuance of the VPDES permit listed below. This permit is being processed as a Major, Municipal permit. The effluent limitations contained in this permit will maintain the Water Quality Standards (WQS) of 9VAC25-260. The proposed discharge will result from the operation of a privately owned sewage treatment plant (SIC Code: 4952 - Sewerage Systems). This permit action consists of reissuing the permit with revisions to the permit, as needed, due to changes in applicable laws, guidance, and available technical information.

1. Facility Name and Address:
Massanutten Public Service Corporation STP
P.O. Box 51
Elkton, VA 22827
Location: 1550 Resort Drive, McGaheysville
2. Permit No. VA0024732; Expiration Date: November 30, 2015

3. Owner: Massanutten Public Service Corporation
Contact Name: Donald Smiley
Title: Area Manager
Telephone No: (540) 289-7088
Email: desmiley@uiwater.com

4. Description of Treatment Works Treating Domestic Sewage:
Total Number of Outfalls: 1

Massanutten PSC STP primarily receives sewage wastewater generated by a ski area, lodge, fitness centers, restaurants, motel, condominiums, water park, and private homes. The treatment units comprising the recently upgraded STP are shown in the schematics included in the permit reissuance application.

Average Discharge Flow (May 2013 – April 2015) = 0.76 MGD
Design Average Flow = 1.5 MGD

5. Application Complete Date: June 15, 2015

Permit Writer: Dawn Jeffries
Reviewed By: Bev Carver

Date: August 28, 2015

Date: September 1, 2015

Public Comment Period: October 9, 2015 to November 8, 2015

6. Receiving Stream Name: Quail Run
River Mile: 5.07
Use Impairment: Yes
Special Standards: pH
Tidal Waters: No
Watershed Name: VAN – B35R SF Shenandoah River/Elk Run/Boone Run
Basin: Potomac; Subbasin: Shenandoah
Section: 2d; Class: IV

- ## 7. Operator License Requirements per 9VAC25-31-200.C: Class II

8. Reliability Class per 9VAC25-790: Class II (assigned November 4, 1985)

- ## 9. Permit Characterization:

☐ Private ☐ Federal ☐ State ☐ POTW ☒ PVOTW

☐ Possible Interstate Effect ☐ Interim Limits in Other Document (attach copy of CSO)

Fact Sheet – VPDES Permit No. VA0024732 – Massanutten PSC STP

10. Discharge Location Description and Receiving Waters Information: Appendix A

11. Antidegradation (AD) Review & Comments per 9VAC25-260-30:

Tier Designation: Tier 1

The State Water Control Board's WQS include an AD policy. All state surface waters are provided one of three levels of AD protection. For Tier 1 or existing use protection, existing uses of the water body and the water quality to protect these uses must be maintained. Tier 2 waters have water quality that is better than the WQS. Significant lowering of the water quality of Tier 2 waters is not allowed without an evaluation of the economic and social impacts. Tier 3 waters are exceptional waters and are so designated by regulatory amendment. The AD policy prohibits new or expanded discharges into exceptional waters.

The AD review begins with a Tier determination. Quail Run downstream of the facility discharge location is determined to be a Tier 1 water. This determination is based on the fact that the stream does not meet the General Standard (Benthics) for aquatic life use. AD baselines are not calculated for Tier 1 waters.

12. Site Inspection: Performed by Dawn Jeffries, Bill VanWart, & Ted Turner on June 16, 2015

13. Effluent Screening and Effluent Limitations: Appendix B

14. Effluent toxicity testing requirements included per 9VAC25-31-220.D: ☒ Yes ☐ No Appendix B

15. Biosolids generated at this facility are land applied by Houff's Feed & Fertilizer Company under their VPA Permits. The VPDES Permit application serves as the Sludge Management Plan and to be approved with the reissuance of the permit. According to the information submitted with the permit application, this facility produces 53.5 dry metric tons of biosolids annually.

16. Bases for Special Conditions: Appendix C

17. Material Storage per 9VAC25-31-280.B.2: This permit requires that the facility's O&M Manual include information to address the management of wastes, fluids, and pollutants which may be present at the facility, to avoid unauthorized discharge of such materials.

18. Antibacksliding Review per 9VAC25-31-220.L: This permit complies with the antibacksliding provisions of the VPDES Permit Regulation.

19. Impaired Use Status Evaluation per 9VAC25-31-220.D: Quail Run in the vicinity of the discharge is listed as impaired for not meeting the General Standard (Benthics) for aquatic life use. This section of stream is also listed as having elevated levels of bacteria. A Total Daily Maximum Load (TMDL) addressing the benthic impairment includes the following waste load allocation (WLA) for this discharge:

Ammonia: 7,185 kg/yr (based on a design flow of 2.0 MGD and a concentration of 2.6 mg/L)

TRC: 27.63 kg/yr (based on a design flow of 2.0 MGD and a concentration of 0.01 mg/L)

A TMDL addressing the bacteria impairment has not been prepared. The permit contains a re-opener condition that may allow the permit limits to be modified, in compliance with section 303(d)(4) of the Act once a TMDL is approved.

20. Regulation of Users per 9VAC25-31-280.B.9: N/A – There are no industrial users contributing to this treatment works.

Fact Sheet – VPDES Permit No. VA0024732 – Massanutten PSC STP

21. Stormwater Management per 9VAC25-31-120: Application Required? ☒ Yes ☐ No
Because the facility has a design flow ≥ 1.0 MGD, a stormwater application is required.

1.5 MGD Facility: A No Exposure Certification (NEC) for Exclusion from VPDES Stormwater Permitting was submitted on June 5, 2015 with the permit reissuance application. The NEC was sent to DEQ inspectors for review and concurrence on June 10, 2015. No stormwater requirements have been included in the permit. The NEC for the existing 1.5 MGD facility will be approved with the reissuance of the permit. A NEC must be submitted once every five years to the Department. If conditions change at the facility, and any industrial materials or activities become exposed to stormwater, coverage under a VPDES permit must be obtained prior to any point source discharge of stormwater from the facility.

2.0 MGD Facility: The permittee has requested effluent limitations for a proposed expansion that would require a stormwater application be submitted. A special condition is included in the permit that describes the application process.

22. Compliance Schedule per 9VAC25-31-250: A schedule of compliance has been included for achieving compliance with final Total Phosphorus and Total Nitrogen limits at the 0.95 MGD permitted flow tier and 1.5 MGD design flow tier.
23. Variances/Alternative Limits or Conditions per 9VAC25-31-280.B, 100.K, and 100.N: The applicant requested and was granted a waiver for sampling TRC at Outfall 001.
24. Financial Assurance Applicability per 9VAC25-650-10: N/A – This facility has a design flow greater than 0.040 MGD.
25. Virginia Environmental Excellence Program (VEEP) Evaluation per § 10.1-1187.1-7: At the time of this reissuance, is this facility considered by DEQ to be a participant in the Virginia Environmental Excellence Program in good standing at either the Exemplary Environmental Enterprise (E3) level or the Extraordinary Environmental Enterprise (E4) level? ☐ Yes ☒ No
26. Nutrient Trading Regulation per 9VAC25-820: See Appendix B
General Permit Required: ☒ Yes ☐ No
This facility is required to maintain coverage under the General Virginia Pollutant Discharge Elimination System (VPDES) Watershed Permit Regulation for Total Nitrogen (TN) and Total Phosphorus (TP) Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia (9VAC25-820) because it is listed with a WLA in the Registration List in 9 VAC 25-820-70. The registration number for this facility is VAN010039.
27. Nutrient monitoring included per Guidance Memo No. 14-2011: ☐ Yes ☒ No
This facility is a Significant Discharger (all facilities not classified as Significant Dischargers as defined in the Nutrient Trading Watershed General Permit Regulation 9VAC25-820) that has previously monitored for TN and TP.
28. Threatened and Endangered (T&E) Species Screening per 9VAC25-260-20 B.8: Because this is not an issuance or reissuance that allows increased discharge flows and because DGIF and DCR did not request to review the permit, T&E screening is not required.

Fact Sheet – VPDES Permit No. VA0024732 – Massanutten PSC STP

29. Public Notice Information per 9VAC25-31-280.B: All pertinent information is on file, and may be inspected and copied by contacting Dawn Jeffries at: DEQ-Valley Regional Office, P.O. Box 3000, Harrisonburg, Virginia 22801, Telephone No. (540) 574-7898, dawn.jeffries@deq.virginia.gov. Persons may comment in writing or by email to the DEQ on the proposed permit action, and may request a public hearing, during the comment period. Comments shall include the name, address, and telephone number of the writer, and shall contain a complete, concise statement of the factual basis for comments. Only those comments received within this period will be considered. The DEQ may decide to hold a public hearing if public response is significant. Requests for public hearings shall state the reason why a hearing is requested, the nature of the issues proposed to be raised in the public hearing and a brief explanation of how the requester's interests would be directly and adversely affected by the proposed permit action. Following the comment period, the Board will make a determination regarding the proposed permit action. This determination will become effective, unless the DEQ grants a public hearing. Due notice of any public hearing will be given.

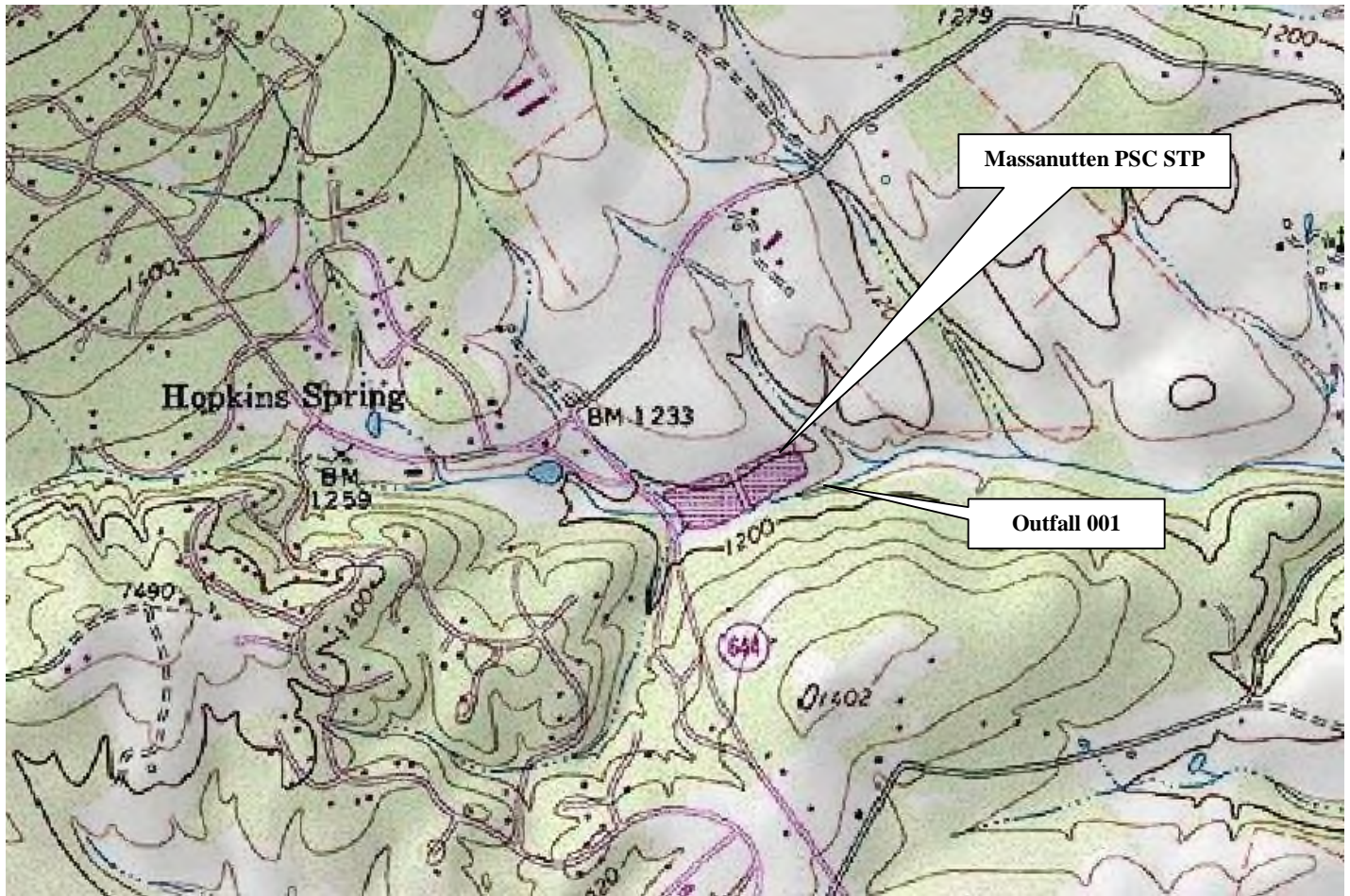
30. Historical Record:

Certificate to Construct (CTC) issued for STP with DAF of 0.10 MGD	September 28, 1972
Certificate to Operate (CTO) issued for the STP with DAF of 0.10 MGD	June 4, 1979
CTO issued for aeration replacement	January 15, 1981
CTO issued for facility upgrade	June 10, 1983
Permit modification to add 0.25 MGD flow tier	September 2, 1983
CTO issued for facility improvements:	October 23, 1990
Consent Order	November 6, 1991
CTO issued for 0.75 MGD STP	September 22, 1993
CTO issued for Breakpoint Chlorination:	December 9, 1996
Consent Order	May 10, 1996
CTO issued for Nitrification System	August 13, 1997
Consent Order	June 21, 1999
Consent Order	April 8, 2002
CTC issued by VDH for 1.5 MGD STP (This was to include the installation of two aeration basins utilizing a 5-stage biological nutrient removal process as well as two denitrification filters utilizing methanol as a carbon source.)	August 16, 2002
CTO issued by VDH for 1.5 MGD STP	February 19, 2003
Consent Order Amendment	July 6, 2004
CTC issued by DEQ for 1.5 MGD STP (This was for the same facility for which a CTC was issued by VDH in 2002 and for which construction occurred in 2003. The CTC indicated the installation of two U.S. Filter Selector Plants that include pre-anaerobic, pre-anoxic, oxic, post-anoxic, and reaeration chambers as well as two denitrification filters with no supplemental carbon provided.)	December 14, 2005
Consent Order	January 17, 2006
Temporary CTO for 1.5 MGD STP	July 20, 2006
CTO issued by DEQ for 1.5 MGD STP:	September 12, 2007
CTO issued by DEQ for lagoon #2, EQ Basin	January 24, 2013

APPENDIX A

DISCHARGE LOCATION AND RECEIVING WATERS INFORMATION

This facility discharges to Quail Run in Rockingham County. The topographical map below shows the location of the treatment facility and Outfall 001.



Fact Sheet – VPDES Permit No. VA0024732 – Massanutten PSC STP

PLANNING INFORMATION

Relevant points of interest within the watershed and in the vicinity of the discharge are shown on the Water Quality Assessments Review table below.

WATER QUALITY ASSESSMENTS REVIEW						
POTOMAC-SHENANDOAH RIVER BASIN						
6/2/2015						
IMPAIRED SEGMENTS						
SEGMENT ID	STREAM	SEGMENT START	SEGMENT END	SEGMENT LENGTH	PARAMETER	
B32R-02-HG	South River/NF Shenandoah/S	163.27	8.16	155.11	Mercury in Fish Tissue	
B33R-01-BAC	South Fork Shenandoah River	100.97	41.98	58.99	Fecal Coliform	
B33R-01-BEN	South Fork Shenandoah River	100.97	41.98	58.99	Benthic	
B35R-01-BAC	Boone Run	13.08	0.00	13.08	Fecal Coliform	
B35R-02-BAC	Quail Run	5.54	0.00	5.54	E-coli, Fecal Coliform	
B35R-02-BEN	Quail Run	4.26	0.00	4.26	Benthic	
B35R-03-BEN	Quail Run	5.54	4.26	1.28	Benthic	
PERMITS						
PERMIT	FACILITY	STREAM	RIVER MILE	LAT	LONG	WBID
VA0024732	Massanutten Public Service	Quail Run	5.07	382418	0784246	VAV-B35R
VA0002178	Merck Sharp & Dehome Corp.	S.F. Shenandoah River	88.09	382316	0783841	VAV-B35R
VA0026433	Elkton STP	S.F. Shenandoah River	85.07	382437	0783807	VAV-B35R
MONITORING STATIONS						
STREAM	NAME	RIVER MILE	RECORD	LAT	LONG	
Boone Run	1BBON000.60	0.6	7/1/1991	382601	0783809	
Boone Run	1BBON001.46	1.46	7/1/2003	382515	0783821	
Quail Run	1BQAL004.82	4.82	9/17/2002	382419	0784229	
Quail Run	1BQAL004.96	4.96	9/17/2002	382420	0784236	
Quail Run	1BQAL005.29	5.29	7/1/1997	382417	0784303	
S.F. Shenandoah River	1BSSF082.15	82.15	9/25/2007	382623	0783749	
S.F. Shenandoah River	1BSSF085.08	85.08	9/23/1999	382433	0783807	
S.F. Shenandoah River	1BSSF088.20	88.2	3/19/2002	382318	0783847	
Quail Run	1BQAL004.30	4.3	7/1/1997	382418	0784200	
S.F. Shenandoah River	1BSSF086.12	86.12	5/4/2006	382355	0783736	
Quail Run	1BQAL005.09	5.10	10/1/1996	382418	0784248	
Quail Run	1BQAL005.04	5.04	10/19/1998	382419	0784244	
PUBLIC WATER SUPPLY INTAKES						
OWNER	STREAM	RIVER MILE				
None						
WATER QUALITY MANAGEMENT PLANNING REGULATION						
Is this discharge addressed in the WQMP regulation? Yes						
If Yes, what effluent limitations or restrictions does the WQMP regulation impose on this discharge?						
PARAMETER	ALLOCATION					
BOD ₅	75.7 kg/d					
Nutrients under the Watershed General Permit						
WATERSHED NAME						
VAV-B35R South Fork Shenandoah River/Elk Run/Boone Run						

Fact Sheet – VPDES Permit No. VA0024732 – Massanutten PSC STP

FLOW FREQUENCY DETERMINATION

The most recent flow data for Quail Run upstream of the discharge point are from 1975. Since that time, the only available stream flow measurements for Quail Run were taken near Rte 646 near McGaheysville, VA (#0162906760) which is downstream of the discharge point. Since the stream flows at the downstream gage are influenced by the discharge and because of the lack of current upstream flow data, the flow frequencies utilized in the permit limit development were assumed to be zero for a most conservative analysis.

EFFLUENT/STREAM MIXING EVALUATION

Mixing zone analyses were not conducted at the point of discharge because the flow frequencies utilized in the permit limit development were assumed to be zero.

Fact Sheet – VPDES Permit No. VA0024732 – Massanutten PSC STP

SITE VISIT

On June 16, 2015 Dawn Jeffries, Ted Turner, and Bill VanWart performed a site visit at the subject facility. The receiving stream was observed at the discharge point, as well as just above it, and at a number of locations below it. The following photos show stream conditions at that visit.



Above Outfall 001 at Rte 644



Closeup View Above Outfall 001 at Rte 644



Outfall 001



Upstream View from Outfall 001

Fact Sheet – VPDES Permit No. VA0024732 – Massanutten PSC STP



Downstream View from Outfall 001



Quail Run at Rte 646



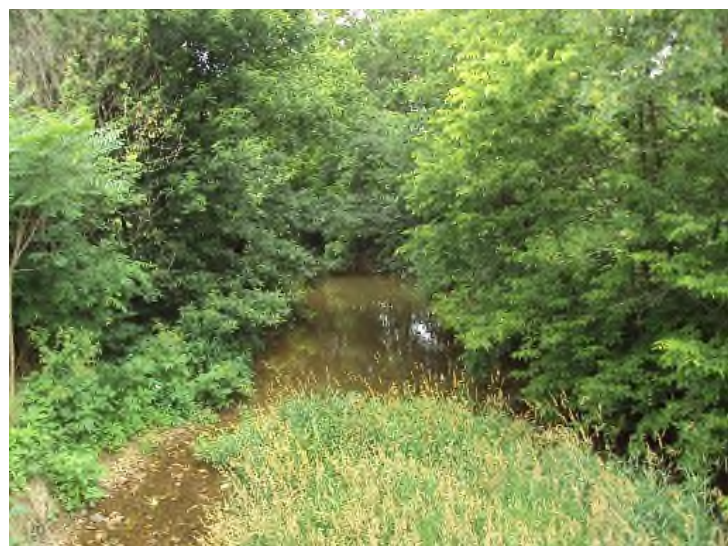
Quail Run at Rte 646



Quail Run at Rte 637



Quail Run at Rte 636



Boone Run at Rte 635

APPENDIX B

EFFLUENT SCREENING AND EFFLUENT LIMITATIONS

EFFLUENT LIMITATIONS

A comparison of technology and water quality-based limits was performed and the most stringent limits were selected, as summarized in the table below.

Outfall 001**Final Limits****Permitted Flow: 0.95 MGD**

PARAMETER	BASIS FOR LIMITS	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
		Monthly Average		Maximum		Frequency	Sample Type
Flow (MGD)	1	NL		NL		Continuous	TIRE
-----	-----	Monthly Average		Weekly Average		-----	-----
BOD ₅	3,4	10 mg/L	36 kg/d	15 mg/L	54 kg/d	3/Week	8 HC
TSS	2	30 mg/L	110 kg/d	45 mg/L	160 kg/d	1/Month	8 HC
Ammonia-N (mg/L)	3	1.4		1.9		3/Week	8 HC
Effluent Chlorine (TRC)(mg/L)*	3	0.0074		0.0084		3/Day at 4-hour intervals	Grab
E. coli (N/100 mL) (geometric mean)	3	126		NA		4/Month* or 3/Week ** 10 am to 4 pm	Grab
		Annual Average		Maximum			
TP – Year to Date (mg/L)	5	NL		NA		1/Month	Calculated
TP – Calendar Year (mg/L)	5	0.30		NA		1/Year	Calculated
TN – Year to Date (mg/L)	5	NL		NA		1/Month	Calculated
TN – Calendar Year (mg/L)	5	4.0		NA		1/Year	Calculated
-----	-----	Minimum		Maximum		-----	-----
pH (S.U.)	3	6.5		9.5		1/Day	Grab
Dissolved Oxygen (mg/L)	3,4	7.5		NA		1/Day	Grab
Contact Chlorine (TRC)(mg/L)*	3,5	1.0		NA		3/Day at 4-hour intervals	Grab

Refer to permit for definitions of monitoring frequencies and sample types

* Applicable only when chlorination is used for disinfection

** Applicable if an alternative to chlorination is used for disinfection

BASIS DESCRIPTIONS

1. VPDES Permit Regulation (9VAC25-31)
2. Federal Effluent Requirements (Secondary Treatment Regulation - 40CFR133)
3. Water Quality Standards (9VAC25-260)
4. QUAL2E Water Quality Stream Model for Massanutten PSC's discharge to Quail Run
5. Best Professional Judgment (BPJ)

Fact Sheet – VPDES Permit No. VA0024732 – Massanutten PSC STP

Outfall 001

Final Limits

Design Flow: 1.5 MGD

PARAMETER	BASIS FOR LIMITS	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
		Monthly Average		Maximum		Frequency	Sample Type
Flow (MGD)	1	NL		NL		Continuous	TIRE
-----	-----	Monthly Average		Weekly Avg.		-----	-----
BOD ₅	3,4	10 mg/L	57 kg/d	15 mg/L	85 kg/d	5/Week	24 HC
TSS	2,6	30 mg/L	170 kg/d	45 mg/L	260 kg/d	1/Month	24 HC
Ammonia-N (mg/L)	3	1.3		1.7		5/Week	24 HC
Effluent Chlorine (TRC)(mg/L)*	3	0.0073		0.0081		4/Day at 4-hour intervals	Grab
E. coli (N/100 mL) (geometric mean)	3	126		NA		4/Month* or 3/Week** 10 am to 4 pm	Grab
		Annual Average		Maximum			
TP – Year to Date (mg/L)	5	NL		NA		1/Month	Calculated
TP – Calendar Year (mg/L)	5	0.30		NA		1/Year	Calculated
TN – Year to Date (mg/L)	5	NL		NA		1/Month	Calculated
TN – Calendar Year (mg/L)	5	4.0		NA		1/Year	Calculated
-----	-----	Minimum		Maximum		-----	-----
pH (S.U.)	3	6.5		9.5		1/Day	Grab
Dissolved Oxygen (mg/L)	3,4	7.5		NA		1/Day	Grab
Contact Chlorine (TRC)(mg/L)*	3,5	1.0		NA		4/Day at 4-hour intervals	Grab

Refer to permit for definitions of monitoring frequencies and sample types

** Applicable only when chlorination is used for disinfection*

*** Applicable if an alternative to chlorination is used for disinfection*

BASIS DESCRIPTIONS

1. *VPDES Permit Regulation (9VAC25-31)*
2. *Federal Effluent Requirements (Secondary Treatment Regulation - 40CFR133)*
3. *Water Quality Standards (9VAC25-260)*
4. *QUAL2E Water Quality Stream Model for Massanutten PSC's discharge to Quail Run*
5. *Best Professional Judgment (BPJ)*
6. *Chesapeake Bay TMDL*

Fact Sheet – VPDES Permit No. VA0024732 – Massanutten PSC STP

Outfall 001

Final Limits

Design Flow: 2.0 MGD

PARAMETER	BASIS FOR LIMITS	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
		Monthly Average		Maximum		Frequency	Sample Type
Flow (MGD)	1	NL		NL		Continuous	TIRE
-----	-----	Monthly Average		Weekly Avg.		-----	-----
BOD ₅	3,4,5	10 mg/L	75.7 kg/d	15 mg/L	110 kg/d	5/Week	24 HC
TSS	6	22 mg/L	170 kg/d	33 mg/L	250 kg/d	1/Month	24 HC
Ammonia-N (mg/L)	3	1.3		1.7		5/Week	24 HC
Effluent Chlorine (TRC)(mg/L)*	3	0.0073		0.0081		4/Day at 4-hour intervals	Grab
E. coli (N/100 mL) (geometric mean)	3	126		NA		4/Month* or 5/Week** 10 am to 4 pm	Grab
-----	-----	Annual Average		Maximum		-----	-----
TP – Year to Date (mg/L)	8	NL		NA		1/Month	Calculated
TP – Calendar Year (mg/L)	8,9	0.30		NA		1/Year	Calculated
TN – Year to Date (mg/L)	8	NL		NA		1/Month	Calculated
TN – Calendar Year (mg/L)	8,9	3.0		NA		1/Year	Calculated
-----	-----	Minimum		Maximum		-----	-----
pH (S.U.)	3	6.5		9.5		1/Day	Grab
Dissolved Oxygen (mg/L)	3,4	7.5		NA		1/Day	Grab
Contact Chlorine (TRC)(mg/L)*	3,7	1.0		NA		4/Day at 4-hour intervals	Grab

Refer to permit for definitions of monitoring frequencies and sample types

* Applicable only when chlorination is used for disinfection

** Applicable if an alternative to chlorination is used for disinfection

BASIS DESCRIPTIONS

1. VPDES Permit Regulation (9VAC25-31)
2. Federal Effluent Requirements (Secondary Treatment Regulation - 40CFR133)
3. Water Quality Standards (9VAC25-260)
4. QUAL2E Water Quality Stream Model for Massanutten PSC's discharge to Quail Run
5. WQMP Regulation (9VAC25-720-50)
6. Chesapeake Bay TMDL
7. Best Professional Judgment (BPJ)
8. Guidance Memo No. 07-2008, Amendment No. 2, 10/23/07, Permitting Considerations for Facilities in the Chesapeake Bay Watershed
9. Annual average concentration limits are based on the Technology Regulation (9VAC25-40)

Fact Sheet – VPDES Permit No. VA0024732 – Massanutten PSC STP

LIMITING FACTORS – OVERVIEW:

The following potential limiting factors have been considered in developing this permit and fact sheet:

Water Quality Management Plan Regulation (WQMP) (9VAC25-720)	
A. TMDL limits	TRC, Ammonia-N
B. Non-TMDL WLAs	BOD₅
C. CBP (TN & TP) WLAs	TN and TP via GP VAN010039
Federal Effluent Guidelines	CBOD₅, TSS, pH
BPJ/Agency Guidance limits	TRC (contact), TN, TP
Water Quality-based Limits - numeric	CBOD₅, DO, TRC (effluent), E. coli, pH, Ammonia-N
Water Quality-based Limits - narrative	None
Technology-based Limits (9VAC25-40-70)	TN, TP
Whole Effluent Toxicity (WET)	See Appendix D
Stormwater Limits	NEC approved with reissuance of the permit

EVALUATION OF THE EFFLUENT – CONVENTIONAL POLLUTANTS:

This facility discharges to Quail Run, which converges with Boone Run prior to flowing into the South Fork Shenandoah River approximately 6 miles downstream of the discharge. The model for this discharge shows instream conditions until the flow reaches the South Fork Shenandoah River. At that point, the model outputs are entered as inputs in the downstream model. Models are maintained in the DEQ-Valley Regional Office and are available for review upon request.

The model demonstrated that the following values are protective of WQC in the receiving stream and in the South Fork Shenandoah River at the highest permitted flow of 2.0 MGD.

CBOD ₅	=	10 mg/L
TKN	=	4.3 mg/L
D.O.	=	7.5 mg/L

A BOD₅ of 10 mg/L is more restrictive than a CBOD₅ of 10 mg/L; therefore, the BOD₅ limits of 10 mg/L have been carried forward from the previous permit for all flow tiers. The BOD₅ loading limits meet the WQMP Regulation BOD₅ WLA of 75.7 kg/d.

The DO limits of 7.5 mg/L have been carried forward from the previous permit for all flow tiers.

The modeled TKN value is more than twice the Ammonia-N WLAc. TKN limits are not necessary when the modeled TKN effluent concentration is more than twice the Ammonia-N WLAc. The Ammonia-N limits (based on chronic toxicity) imposed in the permit are deemed adequate for ensuring compliance with the modeled TKN value, and no TKN limits have been included in this permit.

The TSS limits are consistent with the Secondary Treatment Regulation and with the Chesapeake Bay TMDL WLA for TSS of 137,050 lb/year. Limits have been carried forward from the previous permit for the 0.95 MGD and 1.5 MGD flow tiers, and have been reduced for the 2.0 MGD flow tier. The TSS concentration and loading limits at the 2.0 MGD flow tier were reduced to maintain the TSS loading assigned to this facility in the Chesapeake Bay TMDL.

The pH limits reflect the current WQS for pH in the receiving stream and have been carried forward from the previous permit for all flow tiers.

Fact Sheet – VPDES Permit No. VA0024732 – Massanutten PSC STP

EVALUATION OF THE EFFLUENT – DISINFECTION:

The E. coli limits and monitoring frequencies have been carried forward from the previous permit. These limits reflect the current WQS for E. coli in the receiving stream. Chlorine limits are also specified in the permit, but are only applicable should the facility utilize chlorine disinfection. If chlorine disinfection is used, E. coli monitoring is required 4/Month in one calendar month of each quarter to further demonstrate adequate disinfection. This E. coli monitoring frequency has been changed from 2/Month in accordance with Guidance Memo No. 14-2003.

EVALUATION OF THE EFFLUENT – NUTRIENTS:

In accordance with §62.1-44.19:14.C.5. of the Code of Virginia, this Significant Discharger has submitted a Registration Statement and DEQ has recognized that they are covered under the General VPDES Watershed Permit Regulation for TN and TP Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia (9VAC25-820) (GP). The load limit for TN is 18,273 pounds per calendar year and for TP is 1,371 pounds per calendar year.

The Regulation for Nutrient Enriched Waters and Dischargers within the Chesapeake Bay Watershed (9VAC25-40-70) stipulates the inclusion of technology-based effluent concentration limits in the individual permit for any facility that has installed technology for the control of nitrogen and phosphorous whether by new construction, expansion, or upgrade after June 30, 2005. Annual average concentration limits of TN = 4.0 mg/L and TP = 0.3 mg/L were included for the existing 1.5 MGD facility which reflect the concentrations that were used to establish the load limits listed above. A schedule of compliance has been included for meeting these annual average concentration limits. Technology-based annual average effluent concentration limits of TN = 3.0 mg/L and TP = 0.23 mg/L were included for the expanded 2.0 MGD flow tier. At these annual average concentrations and design flows, the load limits will be met without the need to offset any nutrient loads; therefore, the special condition requiring an offset plan has been removed.

EVALUATION OF THE EFFLUENT – TOXICS:

Stream: Since the stream flows at the downstream bridge are influenced by the discharge and because of the lack of current upstream flow data, the flow frequencies utilized in the permit limit development were assumed to be zero; therefore, ambient stream data are not utilized in the evaluation.

Discharge: The pH, temperature, and hardness values were obtained from data submitted by the permittee.

Effluent Information			
90% Annual Temp (°C) =	23	90% pH (SU) =	8.0
Mean Hardness (mg/L) =	219	10% pH (SU) =	7.3

Fact Sheet – VPDES Permit No. VA0024732 – Massanutten PSC STP

WQC and WLAs were calculated for the WQS parameters for which data are available. The resulting WQC and WLAs are presented in this appendix. The WLAs are identical for all flow tiers since the flow frequencies utilized in the permit limit development were assumed to be zero. Current agency guidelines recommend the evaluation of toxic pollutant limits for TRC and Ammonia-N be based on default effluent concentrations of 20 mg/L and 9 mg/L, respectively. The effluent data were analyzed per the protocol for evaluation of effluent toxic pollutants included in this appendix with the following results:

- **TRC:** More stringent monthly average and weekly average limits at all flow tiers are indicated and have been required. As the facility currently uses only UV disinfection, no schedule of compliance has been included to meet the more stringent limits. The limits are consistent with the TMDL WLAs.
- **Ammonia-N:** Annual Ammonia-N limits have replaced seasonal Ammonia-N limits at all flow tiers. This change is due to the flow frequencies utilized in the permit limit development being assumed to be zero. Limits are less stringent than previous annual limits based on decreased effluent temperature and pH data. Due to the availability of new information, the less stringent limits have been included and comply with antibacksliding requirements. Limits are more stringent than previous wet season limits. Based on a review of effluent data, the facility can consistently meet the more stringent limits; therefore, no compliance schedule has been included. The limits are consistent with the TMDL WLAs.
- **Monitoring data for Dissolved Sulfide** is needed for the existing facility. This monitoring must be performed once after the start of the third year of the permit effective date and submitted with reissuance application using Attachment A of the permit.
- **A complete WQS toxics scan** has been required for the 2.0 MGD flow tier. This monitoring must be performed within 1 year of the issuance of the CTO for the 2.0 MGD facility and must be reported using Attachment B of the permit.

Fact Sheet – VPDES Permit No. VA0024732 – Massanutten PSC STP

WQC-WLA SPREADSHEET INPUT

WATER QUALITY CRITERIA / WASTE LOAD ALLOCATION ANALYSIS

Facility Name:

Massanutten PSC STP

Receiving Stream:

Quail Run

Permit No.: VA0024732

Date: 3/11/2016

Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information

Mean Hardness (as CaCO₃) = mg/L
 90% Temperature (Annual) = deg C
 90% Temperature (Wet season) = deg C
 90% Maximum pH = SU
 10% Maximum pH = SU
 Tier Designation = 1
 Public Water Supply (PWS) Y/N? = N
 V(alley) or P(iedmont)? = V
 Trout Present Y/N? = N
 Early Life Stages Present Y/N? = Y

Stream Flows

1Q10 (Annual) = 0 MGD
 7Q10 (Annual) = 0 MGD
 30Q10 (Annual) = 0 MGD
 1Q10 (Wet season) = 0 MGD
 30Q10 (Wet season) = 0 MGD
 30Q5 = 0 MGD
 Harmonic Mean = 0 MGD

Mixing Information

Annual - 1Q10 Flow = 100 %
 - 7Q10 Flow = 100 %
 - 30Q10 Flow = 100 %
 Wet Season - 1Q10 Flow = 100 %
 - 30Q10 Flow = 100 %

Effluent Information

Mean Hardness (as CaCO₃) = 219 mg/L
 90% Temp (Annual) = 23 deg C
 90% Temp (Wet season) = deg C
 90% Maximum pH = 8.0 SU
 10% Maximum pH = 7.3 SU
 Current Discharge Flow = 0.95 MGD
 Discharge Flow for Limit Analysis = 2.0 MGD

Footnotes:

- All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise.
- All flow values are expressed as Million Gallons per Day (MGD).
- Discharge volumes are highest monthly average or 2C maximum for Industries and design flows for Municipals.
- Hardness expressed as mg/l CaCO₃. Standards calculated using Hardness values in the range of 25-400 mg/l CaCO₃.
- "Public Water Supply" protects for fish & water consumption. "Other Surface Waters" protects for fish consumption only.
- Carcinogen "Y" indicates carcinogenic parameter.
- Ammonia WQSs selected from separate tables, based on pH and temperature.
- Metals measured as Dissolved, unless specified otherwise.
- WLA = Waste Load Allocation (based on standards).
- WLA = Waste Load Allocation (based on standards).
- WLAs are based on mass balances (less background, if data exist).
- Acute - 1 hour avg. concentration not to be exceeded more than 1/3 years.
- Chronic - 4 day avg. concentration (30 day avg. for Ammonia) not to be exceeded more than 1/3 years.
- Mass balances employ 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens, and Harmonic Mean for Carcinogens. Actual flows employed are a function of the mixing analysis and may be less than the actual flows.
- Effluent Limitations are calculated elsewhere using the minimum WLA and EPA's statistical approach (Technical Support Document).

WQC-WLA SPREADSHEET OUTPUT

Facility Name:

Massanutten PSC STP

Receiving Stream:

Quail Run

Permit No.:

VA0024732

Date:

3/11/2016

POST - EXPANSION WATER QUALITY CRITERIA

2.0 MGD Discharge Flow - Mix per "Mixer"

Toxic Parameter and Form	Carcinogen?	Human Health			
		Aquatic Protection		Public Water	Other Surface
		Acute	Chronic	Supplies	Waters
Ammonia-N (Annual)	N	7.9E+00 mg/L	1.3E+00 mg/L	None	None
Antimony	N	None	None	5.6E+00	6.4E+02
Arsenic	N	3.4E+02	1.5E+02	1.0E+01	None
Cadmium	N	9.5E+00	2.1E+00	5.0E+00	None
Chlorine, Total Residual	N	1.9E-02 mg/L	1.1E-02 mg/L	None	None
Chromium (+3)	N	1.1E+03	1.4E+02	None	None
Chromium (+6)	N	1.6E+01	1.1E+01	None	None
Total Chromium	N	None	None	1.0E+02	None
Copper	N	2.8E+01	1.7E+01	1.3E+03	None
Lead	N	3.2E+02	3.7E+01	1.5E+01	None
Mercury	N	1.4E+00	7.7E-01	None	None
Nickel	N	3.5E+02	3.9E+01	6.1E+02	4.6E+03
Selenium, Total Recoverable	N	2.0E+01	5.0E+00	1.7E+02	4.2E+03
Silver	N	1.3E+01	None	None	None
Thallium	N	None	None	2.4E-01	4.7E-01
Zinc	N	2.3E+02	2.3E+02	7.4E+03	2.6E+04

NON-ANTIDEGRADATION WASTE LOAD ALLOCATIONS

2.0 MGD Discharge - Mix per "Mixer"

Toxic Parameter and Form	Carcinogen?	Human Health		
		Aquatic Protection		Human
		Acute	Chronic	Health
Ammonia-N (Annual)	N	7.9E+00 mg/L	1.3E+00 mg/L	N/A
Antimony	N	N/A	N/A	6.4E+02
Arsenic	N	3.4E+02	1.5E+02	N/A
Cadmium	N	9.5E+00	2.1E+00	N/A
Chlorine, Total Residual	N	1.9E-02 mg/L	1.1E-02 mg/L	N/A
Chromium (+3)	N	1.1E+03	1.4E+02	N/A
Chromium (+6)	N	1.6E+01	1.1E+01	N/A
Total Chromium	N	N/A	N/A	N/A
Copper	N	2.8E+01	1.7E+01	N/A
Lead	N	3.2E+02	3.7E+01	N/A
Mercury	N	1.4E+00	7.7E-01	N/A
Nickel	N	3.5E+02	3.9E+01	4.6E+03
Selenium, Total Recoverable	N	2.0E+01	5.0E+00	4.2E+03
Silver	N	1.3E+01	N/A	N/A
Thallium	N	N/A	N/A	4.7E-01
Zinc	N	2.3E+02	2.3E+02	2.6E+04

Fact Sheet – VPDES Permit No. VA0024732 – Massanutten PSC STP

STAT.EXE RESULTS – 0.95 MGD Flow Tier:

<p><u>Ammonia-N</u> Chronic averaging period = 30 WLAa = 7.9 WLAc = 1.3 Q.L. = 0.2 # samples/mo. = 12 # samples/wk. = 3</p> <p>Summary of Statistics:</p> <p># observations = 1 Expected Value = 9 Variance = 29.16 C.V. = 0.6 97th percentile daily values = 21.9007 97th percentile 4 day average = 14.9741 97th percentile 30 day average= 10.8544 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data</p> <p>A limit is needed based on Chronic Toxicity Maximum Daily Limit = 2.6229711214412 Average Weekly Limit = 1.91855570185464 Average Monthly Limit = 1.42907323377461</p> <p>The data are: 9</p>	<p><u>TRC</u> Chemical = TRC Chronic averaging period = 4 WLAa = 0.019 WLAc = 0.011 Q.L. = 0.1 # samples/mo. = 90 # samples/wk. = 21</p> <p>Summary of Statistics:</p> <p># observations = 1 Expected Value = 20 Variance = 144 C.V. = 0.6 97th percentile daily values = 48.6683 97th percentile 4 day average = 33.2758 97th percentile 30 day average= 24.1210 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data</p> <p>A limit is needed based on Chronic Toxicity Maximum Daily Limit = 1.60883226245855E-02 Average Weekly Limit = 8.37736286379463E-03 Average Monthly Limit = 7.39793639872118E-03</p> <p>The data are: 20</p>	
<p><u>Chloride</u> Chronic averaging period = 4 WLAa = 860 WLAc = 230 Q.L. = 1.0 # samples/mo. = 1 # samples/wk. = 1</p> <p>Summary of Statistics:</p> <p># observations = 1 Expected Value = 70 Variance = 1764 C.V. = 0.6 97th percentile daily values = 170.339 97th percentile 4 day average = 116.465 97th percentile 30 day average= 84.4237 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data</p> <p>No Limit is required for this material</p> <p>The data are: 70</p>	<p><u>Copper</u> Chronic averaging period = 4 WLAa = 28 WLAc = 17 Q.L. = 0.5 # samples/mo. = 1 # samples/wk. = 1</p> <p>Summary of Statistics:</p> <p># observations = 3 Expected Value = 9.2 Variance = 30.4704 C.V. = 0.6 97th percentile daily values = 22.3874 97th percentile 4 day average = 15.3068 97th percentile 30 day average= 11.0956 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data</p> <p>No Limit is required for this material</p> <p>The data are: 12.4, 9.2, 6</p>	<p><u>Zinc</u> Chronic averaging period = 4 WLAa = 230 WLAc = 230 Q.L. = 2.0 # samples/mo. = 1 # samples/wk. = 1</p> <p>Summary of Statistics:</p> <p># observations = 4 Expected Value = 33.1 Variance = 394.419 C.V. = 0.6 97th percentile daily values = 80.5461 97th percentile 4 day average = 55.0714 97th percentile 30 day average= 39.9203 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data</p> <p>No Limit is required for this material</p> <p>The data are: 43.4, 27.9, 35.8, 25.3</p>

Fact Sheet – VPDES Permit No. VA0024732 – Massanutten PSC STP

STAT.EXE RESULTS – 1.5 MGD Flow Tier:

<p><u>Ammonia-N</u> Chronic averaging period = 30 WLAa = 7.9 WLAc = 1.3 Q.L. = 0.2 # samples/mo. = 20 # samples/wk. = 5</p> <p>Summary of Statistics:</p> <p># observations = 1 Expected Value = 9 Variance = 29.16 C.V. = 0.6 97th percentile daily values = 21.9007 97th percentile 4 day average = 14.9741 97th percentile 30 day average= 10.8544 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data</p> <p>A limit is needed based on Chronic Toxicity Maximum Daily Limit = 2.6229711214412 Average Weekly Limit = 1.70954325086013 Average Monthly Limit = 1.34991672526953</p> <p>The data are: 9</p>	<p><u>TRC</u> Chronic averaging period = 4 WLAa = 0.019 WLAc = 0.011 Q.L. = 0.1 # samples/mo. = 120 # samples/wk. = 28</p> <p>Summary of Statistics:</p> <p># observations = 1 Expected Value = 20 Variance = 144 C.V. = 0.6 97th percentile daily values = 48.6683 97th percentile 4 day average = 33.2758 97th percentile 30 day average= 24.1210 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data</p> <p>A limit is needed based on Chronic Toxicity Maximum Daily Limit = 1.60883226245855E-02 Average Weekly Limit = 8.12555454397973E-03 Average Monthly Limit = 7.29256193358322E-03</p> <p>The data are: 20</p>
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<p><u>Chloride</u> Chronic averaging period = 4 WLAa = 860 WLAc = 230 Q.L. = 1.0 # samples/mo. = 1 # samples/wk. = 1</p> <p>Summary of Statistics:</p> <p># observations = 1 Expected Value = 70 Variance = 1764 C.V. = 0.6 97th percentile daily values = 170.339 97th percentile 4 day average = 116.465 97th percentile 30 day average= 84.4237 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data</p> <p>No Limit is required for this material</p> <p>The data are: 70</p>	<p><u>Copper</u> Chronic averaging period = 4 WLAa = 28 WLAc = 17 Q.L. = 0.5 # samples/mo. = 1 # samples/wk. = 1</p> <p>Summary of Statistics:</p> <p># observations = 3 Expected Value = 9.2 Variance = 30.4704 C.V. = 0.6 97th percentile daily values = 22.3874 97th percentile 4 day average = 15.3068 97th percentile 30 day average= 11.0956 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data</p> <p>No Limit is required for this material</p> <p>The data are: 12.4, 9.2, 6</p>	<p><u>Zinc</u> Chronic averaging period = 4 WLAa = 230 WLAc = 230 Q.L. = 2.0 # samples/mo. = 1 # samples/wk. = 1</p> <p>Summary of Statistics:</p> <p># observations = 4 Expected Value = 33.1 Variance = 394.419 C.V. = 0.6 97th percentile daily values = 80.5461 97th percentile 4 day average = 55.0714 97th percentile 30 day average= 39.9203 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data</p> <p>No Limit is required for this material</p> <p>The data are: 43.4, 27.9, 35.8, 25.3</p>
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Fact Sheet – VPDES Permit No. VA0024732 – Massanutten PSC STP

STAT.EXE RESULTS – 2.0 MGD Flow Tier:

<p><u>Ammonia-N</u> Chronic averaging period = 30 WLAa = 7.9 WLAc = 1.3 Q.L. = 0.2 # samples/mo. = 20 # samples/wk. = 5</p> <p>Summary of Statistics:</p> <p># observations = 1 Expected Value = 9 Variance = 29.16 C.V. = 0.6 97th percentile daily values = 21.9007 97th percentile 4 day average = 14.9741 97th percentile 30 day average= 10.8544 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data</p> <p>A limit is needed based on Chronic Toxicity Maximum Daily Limit = 2.6229711214412 Average Weekly Limit = 1.70954325086013 Average Monthly Limit = 1.34991672526953</p> <p>The data are: 9</p>	<p><u>TRC</u> Chronic averaging period = 4 WLAa = 0.019 WLAc = 0.011 Q.L. = 0.1 # samples/mo. = 120 # samples/wk. = 28</p> <p>Summary of Statistics:</p> <p># observations = 1 Expected Value = 20 Variance = 144 C.V. = 0.6 97th percentile daily values = 48.6683 97th percentile 4 day average = 33.2758 97th percentile 30 day average= 24.1210 # < Q.L. = 0 Model used = BPJ Assumptions, type 2 data</p> <p>A limit is needed based on Chronic Toxicity Maximum Daily Limit = 1.60883226245855E-02 Average Weekly Limit = 8.12555454397973E-03 Average Monthly Limit = 7.29256193358322E-03</p> <p>The data are: 20</p>
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PROTOCOL FOR THE EVALUATION OF THE EFFLUENT – TOXIC POLLUTANTS

Toxic pollutants were evaluated in accordance with OWP Guidance Memo No. 00-2011. Acute and Chronic WLAs (WLA_a and WLA_c) were analyzed according to the protocol below using a statistical approach (STAT.exe) to determine the necessity and magnitude of limits. Human Health WLAs (WLA_{hh}) were analyzed according to the same protocol through a simple comparison with the effluent data. If the WLA_{hh} exceeded the effluent datum or data mean, no limits were required. If the effluent datum or data mean exceeded the WLA_{hh} , the WLA_{hh} was imposed as the limit.

Since there are no data available for any toxic pollutants immediately upstream of this discharge, all upstream (background) pollutant concentrations are assumed to be "0".

The steps used in evaluating the effluent data are as follows:

- A. If all data are reported as "below detection" or $<$ the Quantification Level (QL):
 - A.1. and at least one detection level is \leq the required QL, then the pollutant is considered to be not significantly present in the discharge and no further monitoring is required.
 - A.2. and all detection levels are $>$ the required QL but the parameter was previously evaluated and no limits were determined to be needed, then the pollutant is considered to be not significantly present in the discharge and no further monitoring is required.
- B. If all data are reported as "below detection", and all detection levels are $>$ the required QL, then an evaluation is performed in which the pollutant is assumed present at the lowest reported detection level.
 - B.1. If the evaluation indicates that no limits are needed, then the existing data set is adequate and no further monitoring is required.
 - B.2. If the evaluation indicates that limits are needed, then the existing data set is inadequate to make a determination and additional monitoring is required.
- C. If any data value is reported as detectable at or above the required QL, then the data are adequate to determine whether effluent limits are needed.
 - C.1. If the evaluation indicates that no limits are needed, then no further monitoring is required.
 - C.2. If the evaluation indicates that limits are needed, then the limits and associated requirements are specified in the draft permit.
 - C.3. (Exception for Metals data only) If the evaluation indicates that limits are needed, but the data are reported as a form other than "Dissolved" (except for Selenium), then the existing data set is inadequate to make a determination and additional monitoring is required.

Fact Sheet – VPDES Permit No. VA0024732 – Massanutten PSC STP

0.95 MGD & 1.5 MGD Flow Tiers

Parameter	CASRN	QL (ug/L)	Data (ug/L unless noted otherwise)	Source of Data	Data Eval
METALS					
Antimony, dissolved	7440-36-0	0.2	<10, <10	b, d	A.2
Arsenic, dissolved	7440-38-2	1.0	<5.0, <5.0, <5.0, <5.0	b, d	A.2
Barium, dissolved	7440-39-3	---	Applicable to PWS waters only	---	---
Cadmium, dissolved	7440-43-9	0.3	<1.0, <1.0, <1.0, <1.0	b, d	A.2
Chromium III, dissolved	16065-83-1	0.5	Previously Evaluated. No further monitoring required.	---	---
Chromium VI, dissolved	18540-29-9	0.5	Previously Evaluated. No further monitoring required.	---	---
Chromium, Total	7440-47-3	---	Applicable to PWS waters only	---	---
Copper, dissolved	7440-50-8	0.5	12.4, 9.2, 6.0	b, d	C.1
Iron, dissolved	7439-89-6	1.0	Applicable to PWS waters only	---	---
Lead, dissolved	7439-92-1	0.5	<1.0, <1.0, <1.0	b, d	A.2
Manganese, dissolved	7439-96-5	0.2	Applicable to PWS waters only	---	---
Mercury, dissolved	7439-97-6	1.0	<1.0, <1.0, <1.0, <1.0	b, d	A.1
Nickel, dissolved	7440-02-0	0.5	<10.0	b, d	A.2
Selenium, total recoverable	7782-49-2	2.0	<5.0, <5.0.	b, d	A.2
Silver, dissolved	7440-22-4	0.2	<5.0, <5.0, <5.0, <5.0	b, d	A.2
Thallium, dissolved	7440-28-0	---	<1.0, <1.0, <1.0, <1.0	b, d	A.1
Zinc, dissolved	7440-66-6	2.0	43.4, 27.9, 35.8, 25.3	b, d	C.1
PESTICIDES/PCBS					
Aldrin ^C	309-00-2	0.05	<0.503	b	A.2
Chlordane ^C	57-74-9	0.2	<0.503	b	A.2
Chlorpyrifos	2921-88-2	---	<10.2	b	A.1
DDD ^C	72-54-8	0.1	<0.503	b	A.2
DDE ^C	72-55-9	0.1	<0.503	b	A.2
DDT ^C	50-29-3	0.1	<0.503	b	A.2
Demeton	8065-48-3	---	<10.2	b	A.1
Diazinon	333-41-5	---	<0.52	b	A.1
Dieldrin ^C	60-57-1	0.1	<0.503	b	A.2
Alpha-Endosulfan	959-98-8	0.1	<0.503	b	A.2
Beta-Endosulfan	33213-65-9	0.1	<0.503	b	A.2
Alpha-Endosulfan + Beta-Endosulfan		---	<1.06	b	A.1
Endosulfan Sulfate	1031-07-8	0.1	<0.503	b	A.2
Endrin	72-20-8	0.1	<0.503	b	A.2
Endrin Aldehyde	7421-93-4	---	<0.503	b	A.1
Guthion	86-50-0	---	<10.2	b	A.1
Heptachlor ^C	76-44-8	0.05	<0.503	b	A.2
Heptachlor Epoxide ^C	1024-57-3	---	<0.503	b	A.1
Hexachlorocyclohexane Alpha-BHC ^C	319-84-6	---	<0.503	b	A.1
Hexachlorocyclohexane Beta-BHC ^C	319-85-7	---	<0.503	b	A.1
Hexachlorocyclohexane Gamma-BHC (synonym = Lindane)	58-89-9	---	<0.503	b	A.1
Kepon	143-50-0	---	<10.2	b	A.1
Malathion	121-75-5	---	<10.2	b	A.1

Fact Sheet – VPDES Permit No. VA0024732 – Massanutten PSC STP

Parameter	CASRN	QL (ug/L)	Data (ug/L unless noted otherwise)	Source of Data	Data Eval
Methoxychlor	72-43-5	---	<10.2	b	A.1
Mirex	2385-85-5	---	<10.2	b	A.1
Parathion	56-38-2	---	<10.2	b	A.1
PCB Total ^c	1336-36-3	7.0	<3.521	b	A.1
Toxaphene ^c	8001-35-2	5.0	<5.03	b	A.2
BASE NEUTRAL EXTRACTABLES					
Acenaphthene	83-32-9	10.0	<10.2, <10.0, <10.0, <10.0	b, d	A.1
Anthracene	120-12-7	10.0	<10.2, <10.0, <10.0, <10.0	b, d	A.1
Benzidine ^c	92-87-5	---	<10.2, <10.0, <10.0, <10.0	b, d	A.1
Benzo (a) anthracene ^c	56-55-3	10.0	<10.2, <10.0, <10.0, <10.0	b, d	A.1
Benzo (b) fluoranthene ^c	205-99-2	10.0	<10.2, <10.0, <10.0, <10.0	b, d	A.1
Benzo (k) fluoranthene ^c	207-08-9	10.0	<10.2, <10.0, <10.0, <10.0	b, d	A.1
Benzo (a) pyrene ^c	50-32-8	10.0	<10.2, <10.0, <10.0, <10.0	b, d	A.1
Bis 2-Chloroethyl Ether ^c	111-44-4	---	<10.2, <10.0, <10.0, <10.0	b, d	A.1
Bis 2-Chloroisopropyl Ether	108-60-1	---	<10.2, <10.0, <10.0, <10.0	b, d	A.1
Bis-2-Ethylhexyl Phthalate ^c	117-81-7	10.0	<10.2, <10.0, <10.0, <10.0	b, d	A.1
Butyl benzyl phthalate	85-68-7	10.0	<10.2, <10.0, <10.0, <10.0	b, d	A.1
2-Chloronaphthalene	91-58-7	---	<10.2, <10.0, <10.0, <10.0	b, d	A.1
Chrysene ^c	218-01-9	10.0	<10.2, <10.0, <10.0, <10.0	b, d	A.1
Dibenz(a,h)anthracene ^c	53-70-3	20.0	<10.2, <10.0, <10.0, <10.0	b, d	A.1
1,2-Dichlorobenzene	95-50-1	10.0	<10.2, <1.00, <1.00, <1.00	b, d	A.1
1,3-Dichlorobenzene	541-73-1	10.0	<10.2, <1.00, <1.00, <1.00	b, d	A.1
1,4-Dichlorobenzene	106-46-7	10.0	<10.2, <1.00, <1.00, <1.00	b, d	A.1
3,3-Dichlorobenzidine ^c	91-94-1	---	<10.2, <10.0, <10.0, <10.0	b, d	A.1
Diethyl phthalate	84-66-2	10.0	<10.2, <10.0, <10.0, <10.0	b, d	A.1
Dimethyl phthalate	131-11-3	---	<10.2, <10.0	b, d	A.1
Di-n-Butyl Phthalate	84-74-2	10.0	<10.2, <10.0, <10.0, <10.0	b, d	A.1
2,4-Dinitrotoluene	121-14-2	10.0	<10.2, <10.0, <10.0, <10.0	b, d	A.1
1,2-Diphenylhydrazine ^c	122-66-7	---	<10.2, <10.0, <10.0, <10.0	b, d	A.1
Fluoranthene	206-44-0	10.0	<10.2, <10.0, <10.0	b, d	A.1
Fluorene	86-73-7	10.0	<10.2, <10.0, <10.0, <10.0	b, d	A.1
Hexachlorobenzene ^c	118-74-1	---	<10.2, <10.0, <10.0, <10.0	b, d	A.1
Hexachlorobutadiene ^c	87-68-3	---	<10.2, <10.0, <10.0, <10.0	b, d	A.1
Hexachlorocyclopentadiene	77-47-4	---	<10.2, <10.0, <10.0, <10.0	b, d	A.1
Hexachloroethane ^c	67-72-1	---	<10.2, <10.0, <10.0, <10.0	b, d	A.1
Indeno(1,2,3-cd)pyrene ^c	193-39-5	20.0	<10.2, <10.0, <10.0, <10.0	b, d	A.1
Isophorone ^c	78-59-1	10.0	<10.2, <10.0, <10.0, <10.0	b, d	A.1
Nitrobenzene	98-95-3	10.0	<10.2, <10.0, <10.0, <10.0	b, d	A.1
N-Nitrosodimethylamine ^c	62-75-9	---	<10.2, <10.0, <10.0, <10.0	b, d	A.1
N-Nitrosodi-n-propylamine ^c	621-64-7	---	<10.2, <10.0, <10.0, <10.0	b, d	A.1
N-Nitrosodiphenylamine ^c	86-30-6	---	<10.2, <10.0, <10.0, <10.0	b, d	A.1
Pyrene	129-00-0	10.0	<10.2, <10.0, <10.0, <10.0	b, d	A.1
1,2,4-Trichlorobenzene	120-82-1	10.0	<10.2, <10.0, <10.0, <10.0	b, d	A.1

Fact Sheet – VPDES Permit No. VA0024732 – Massanutten PSC STP

Parameter	CASRN	QL (ug/L)	Data (ug/L unless noted otherwise)	Source of Data	Data Eval
VOLATILES					
Acrolein	107-02-8	---	<10, <10, <10, <10	b, d	A.1
Acrylonitrile ^C	107-13-1	---	<10.0, <10.0, <10.0, <10.0	b, d	A.1
Benzene ^C	71-43-2	10.0	<1.00, <1.00, <1.00, <1.00	b, d	A.1
Bromoform ^C	75-25-2	10.0	<1.00, <1.00, <1.00, <1.00	b, d	A.1
Carbon Tetrachloride ^C	56-23-5	10.0	<1.00, <1.00, <1.00, <1.00	b, d	A.1
Chlorobenzene	108-90-7	50.0	<1.00, <1.00, <1.00, <1.00	b, d	A.1
Chlorodibromomethane ^C	124-48-1	10.0	<1.00, <1.00, <1.00, <1.00	b, d	A.1
Chloroform	67-66-3	10.0	<1.00, <1.00, <1.00, <1.00	b, d	A.1
Dichlorobromomethane ^C	75-27-4	10.0	<1.00, <1.00, <1.00, <1.00	b, d	A.1
1,2-Dichloroethane ^C	107-06-2	10.0	<1.00, <1.00, <1.00, <1.00	b, d	A.1
1,1-Dichloroethylene	75-35-4	10.0	<1.00, <1.00, <1.00, <1.00	b, d	A.1
1,2-trans-dichloroethylene	156-60-5	---	<1.00, <1.00, <1.00, <1.00	b, d	A.1
1,2-Dichloropropane ^C	78-87-5	---	<1.00, <1.00, <1.00, <1.00	b, d	A.1
1,3-Dichloropropene ^C	542-75-6	---	<1.00, <1.00, <1.00, <1.00	b, d	A.1
Ethylbenzene	100-41-4	10.0	<1.00, <1.00, <1.00, <1.00	b, d	A.1
Methyl Bromide	74-83-9	---	<1.00, <1.00, <1.00, <1.00	b, d	A.1
Methylene Chloride ^C	75-09-2	20.0	<1.00, <1.00, <1.00, <1.00	b, d	A.1
1,1,2,2-Tetrachloroethane ^C	79-34-5	---	<1.00, <1.00, <1.00, <1.00	b, d	A.1
Tetrachloroethylene	127-18-4	10.0	<1.00, <1.00, <1.00, <1.00	b, d	A.1
Toluene	10-88-3	10.0	<1.00, <1.00, <1.00, <1.00	b, d	A.1
1,1,2-Trichloroethane ^C	79-00-5	---	<1.00, <1.00, <1.00, <1.00	b, d	A.1
Trichloroethylene ^C	79-01-6	10.0	<1.00, <1.00, <1.00, <1.00	b, d	A.1
Vinyl Chloride ^C	75-01-4	10.0	<1.00, <1.00, <1.00, <1.00	b, d	A.1
RADIONUCLIDES					
Beta Particle & Photon Activity (mrem/yr)	N/A	---	Applicable to PWS waters only	---	---
Combined Radium 226 and 228 (pCi/L)	N/A	---	Applicable to PWS waters only	---	---
Gross Alpha Particle Activity (pCi/L)	N/A	---	Applicable to PWS waters only	---	---
Uranium	N/A	---	Applicable to PWS waters only	---	---
ACID EXTRACTABLES					
2-Chlorophenol	95-57-8	10.0	<10.2, <10.0, <10.0, <10.0	b, d	A.1
2,4-Dichlorophenol	120-83-2	10.0	<10.2, <10.0, <10.0, <10.0	b, d	A.1
2,4-Dimethylphenol	105-67-9	10.0	<10.2, <10.0, <10.0, <10.0	b, d	A.1
2,4-Dinitrophenol	51-28-5	---	<10.2, <10.0, <10.0, <10.0	b, d	A.1
2-Methyl-4,6-Dinitrophenol	534-52-1	---	<10.2, <10.0, <10.0, <10.0	b, d	A.1
Nonylphenol	104-40-51	---	<10.2	b	A.1
Pentachlorophenol ^C	87-86-5	50.0	<10.2, <10.0, <10.0, <10.0	b, d	A.1
Phenol	108-95-2	10.0	<10.2, <10.0, <10.0	b, d	A.1
2,4,6-Trichlorophenol ^C	88-06-2	10.0	<10.2, <10.0, <10.0, <10.0	b, d	A.1
MISCELLANEOUS					
Ammonia-N (mg/L)	766-41-7	0.2 mg/L	Default = 9 mg/L	a	C.2
Chloride (mg/L)	16887-00-6	---	70 mg/L	b	C.1

Fact Sheet – VPDES Permit No. VA0024732 – Massanutten PSC STP

Parameter	CASRN	QL (ug/L)	Data (ug/L unless noted otherwise)	Source of Data	Data Eval
TRC (mg/L)	7782-50-5	0.1 mg/L	Default = 20 mg/L	a	C.2
Cyanide, Free	57-12-5	10.0	Previously Evaluated. No further monitoring required.	---	---
2,4-Dichlorophenoxy acetic acid (synonym = 2,4-D)	94-75-7	---	Applicable to PWS waters only	---	---
Dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin)(ppq)	1746-01-6	0.01	Applicable to Paper Mills & Oil Refineries only	---	---
Foaming Agents (as MBAS)	N/A	---	Applicable to PWS waters only	---	---
Sulfide, dissolved	18496-25-8	100	NEW REQUIREMENT. Needs to be sampled.		
Nitrate as N (mg/L)	14797-55-8	---	Applicable to PWS waters only	---	---
Sulfate (mg/L)	N/A	---	Applicable to PWS waters only	---	---
Total Dissolved Solids (mg/L)	N/A	---	Applicable to PWS waters only	---	---
Tributyltin	60-10-5	---	<0.03	b	A.1
2-(2,4,5-Trichlorophenoxy) propionic acid (synonym = Silvex)	93-72-1	---	Applicable to PWS waters only	---	---
Hardness (mg/L as CaCO ₃)	471-34-1	---	204, 200, 220, 228, 218, 222, 208, 230, 228, 228, 210, 210, 197	b, c, d	---

The **superscript "C"** following the parameter name indicates that the substance is a known or suspected carcinogen; human health criteria at risk level 10⁻⁵.

CASRN = Chemical Abstract Service Registry Number for each parameter is referenced in the current Water Quality Standards. A unique numeric identifier designating only one substance. The Chemical Abstract Service is a division of the American Chemical Society.

“Source of Data” codes:

a = default effluent concentration
b = data from permittee monitoring; 11/19/14
c = data from WET test samples, 2012-2014
d = 2014 data submitted per Form 2 A requirements

"Data Evaluation" codes:

See section titled PROTOCOL FOR THE EVALUATION OF EFFLUENT TOXIC POLLUTANTS for an explanation of the code used.

2.0 MGD Flow Tier

Parameter	CASRN	QL (ug/L)	Data (ug/L unless noted otherwise)	Source of Data	Data Eval
Ammonia-N (mg/L)	766-41-7	0.2 mg/L	Default = 9 mg/L	a	C.2
TRC (mg/L)	7782-50-5	0.1 mg/L	Default = 20 mg/L	a	C.2

The **superscript "C"** following the parameter name indicates that the substance is a known or suspected carcinogen; human health criteria at risk level 10⁻⁵.

CASRN = Chemical Abstract Service Registry Number for each parameter is referenced in the current Water Quality Standards. A unique numeric identifier designating only one substance. The Chemical Abstract Service is a division of the American Chemical Society.

“Source of Data” codes:

a = default effluent concentration

"Data Evaluation" codes:

See section titled PROTOCOL FOR THE EVALUATION OF EFFLUENT TOXIC POLLUTANTS for an explanation of the code used.

WHOLE EFFLUENT TOXICITY (WET) EVALUATION:

Applicability of WET Testing:

Effluent toxicity monitoring is being required for all flow tiers in this permit. DEQ guidance states that a sewage treatment plant with a design flow greater than or equal to 1.0 MGD will be subject to Toxics Management Program (TMP) requirements (TMP Guidance Memo No. 00-2012, 8/4/2000, Part IV.2.A). This facility has a design flow of 1.5 MGD. Also, this facility discharges to a zero-flow stream, and the receiving stream is impaired for benthics.

Summary of Toxicity Testing:

The previous permit required annual chronic testing using *Ceriodaphnia dubia* and *Pimephales promelas* for the existing facility. Table 1 contains a summary of the toxicity testing results during the term of the permit. These data were evaluated using the procedures outlined in the TMP guidance.

Rationale for Acute versus Chronic Toxicity Testing:

0.95 MGD & 1.5 MGD Flow Tiers: Acute toxicity testing requirements were removed from the permit at the 2010 reissuance, and the previous permit requires only chronic toxicity testing for the 1.5 MGD facility and the 0.95 MGD operating flow tier. Results indicate that the 48-hour LC₅₀ was > 100% in all of the chronic toxicity tests of the previous permit term. In addition, no chronic toxicity was noted; therefore, no acute toxicity testing has been required in the reissued permit for the existing facility. The permit contains language that should chronic WET monitoring result in a 48-hour LC₅₀ ≤ 100% effluent; the permittee must commence acute toxicity testing.

2.0 MGD Flow Tier: Upon expansion, both acute and chronic WET monitoring are required for the new facility.

Criteria for Acute Toxicity Testing:

The IWCa for each flow tier is > 33% so any acute tests, should they become applicable, are based on the calculation of a valid NOAEC.

Rationale for Most Sensitive Species:

Per the TMP Guidance and the “published rule” (EPA Form 2A application requirements), both species (*Ceriodaphnia dubia* and *Pimephales promelas*) will be required for testing for all flow tiers.

Sample Type:

For the 0.95 MGD flow tier: A sample type of 8 hour composite is required for WET monitoring.

For the 1.5 MGD & 2.0 MGD flow tiers: A sample type of 24 hour composite is required for WET monitoring.

Rationale for Monitoring Frequency:

0.95 MGD & 1.5 MGD Flow Tiers: Annual chronic monitoring has been at the 0.95 MGD & 1.5 MGD flow tiers. If acute monitoring becomes necessary based on toxicity, it is required quarterly.

2.0 MGD Flow Tier: The permittee will be required to perform quarterly monitoring starting in the calendar quarter that is six months from the date of issuance of a CTO for the 2.0 MGD facility. The monitoring shall continue until a total of four quarters is completed. The results from all the quarterly testing will be evaluated to determine if there is a need for any WET limits. If no limits are deemed necessary, and all tests are acceptable, the facility will move to annual monitoring at a time period specified by DEQ.

Calculation of WLAs: Acute and chronic WLAs were generated from the WETLimit10.xls spreadsheet by entering the design flow, stream flows, and stream mix percentages for the respective stream flows.

Dilution Series:

The recommended dilution series is the standard 0.5 series for chronic and acute tests for all flow tiers.

Fact Sheet – VPDES Permit No. VA0024732 – Massanutten PSC STP

Stat.exe Limit Evaluation:

The WLAs are used in the Department's Stat.exe program in order to perform a statistical evaluation of the chronic test results expressed as Toxicity Units (TUs). The toxicity data are analyzed separately by species and test type (acute or chronic).

Chronic Stat.exe Limit Evaluation:

The summary of the chronic toxicity testing data are shown in Table 1. The chronic toxicity data were not run through Stat.exe because even though the data were TUC = 1.0, indicating no toxicity, they would have automatically triggered a limit due to the WLAc of 1 being the same as the test QL of 1.0. Since all tests showed TUC of 1.0, which meets the permit criteria for the chronic tests, a WET limit is not required.

Acute Stat.exe Limit Evaluation:

There are no acute data to be evaluated from the previous permit term.

Midpoint Check Stat.exe Evaluation:

Because the recommended dilution series is the standard 0.5 series, a midpoint check is not necessary.

Table 1
Summary of Chronic Toxicity Testing

Monitoring Period	Test Start Date	Chronic 3-Brood Static Renewal Survival and Reproduction <i>Ceriodaphnia dubia</i> (TUC)				Chronic 7-Day Static Renewal Survival and Growth <i>Pimephales promelas</i> (TUC)			
		Survival (TUC)	Repro (TUC)	48-hr LC ₅₀	Surv in 100%	Survival (TUC)	Growth (TUC)	48-hr LC ₅₀	Surv in 100%
Previous Permit*	8/11/10	1.0	1.0	>100%	100%	1.0	1.0	>100%	98%
1 st Annual	8/9/11	1.0	1.0	>100%	100%	1.0	1.0	>100%	98%
2 nd Annual	8/14/12	---	---	---	---	1.0	1.0	>100%	100%
2 nd Annual C.d. Retest**	9/19/12	1.0	1.0	>100%	100%	---	---	---	---
3 rd Annual	8/20/13	1.0	1.0	>100%	90%	1.0	1.0	>100%	98%
4 th Annual	8/5/14	1.0	1.0	>100%	100%	1.0	1.0	>100%	100%
5 th Annual	8/4/15	1.0	1.0	>100%	90%	1.0	1.0	>100%	75%

*Test results not evaluated at previous reissuance; therefore are included now

**C.d. test from 8/14/12 repeated 9/19/12 due to inverse concentration response.

Fact Sheet – VPDES Permit No. VA0024732 – Massanutten PSC STP

Table 2
WETLim10.xls Spreadsheet

Spreadsheet for determination of WET test endpoints or WET limits									
Excel 97 Revision Date: 12/13/13 File: WETLim10.xls (MIX.EXE required also)			<div> <div>Acute Endpoint/Permit Limit</div> <div>Use as LC₅₀ in Special Condition, as TUa on DMR</div> </div>						
ACUTE			100% =	NOAEC	LC ₅₀ = NA		% Use as	NA	TUa
ACUTE WLAa			0.3	Note: Inform the permittee that if the mean of the data exceeds this TUa: 1.0 a limit may result using STATS.EXE					
Chronic Endpoint/Permit Limit			Use as NOEC in Special Condition, as TUc on DMR						
CHRONIC			1.46257468 TU _c	NOEC =	69 %	Use as	1.44	TU _c	
BOTH*			3.00000007 TU _c	NOEC =	34 %	Use as	2.94	TU _c	
AML			1.46257468 TU _c	NOEC =	69 %	Use as	1.44	TU _c	
ACUTE WLAa,c			3	Note: Inform the permittee that if the mean of the data exceeds this TUc: 1.0 a limit may result using STATS.EXE					
CHRONIC WLAc			1	* Both means acute expressed as chronic					
% Flow to be used from MIX.EXE			Diffuser /modeling study?						
Plant Flow:			2 MGD	Enter Y/N		n			
Acute 1Q10:			0 MGD	Acute		1 :1			
Chronic 7Q10:			0 MGD	Chronic		1 :1			
Are data available to calculate CV? (Y/N)			N	(Minimum of 10 data points, same species, needed)					Go to Page 2
Are data available to calculate ACR? (Y/N)			N	(NOEC<LC50, do not use greater/less than data)					Go to Page 3
IWC _a			100 %	Plant flow/plant flow + 1Q10		NOTE: If the IWC _a is >33%, specify the NOAEC = 100% test/endpoint for use			
IWC _c			100 %	Plant flow/plant flow + 7Q10					
Dilution, acute			1	100/IWC _a					
Dilution, chronic			1	100/IWC _c					
WLA _a			0.3	Instream criterion (0.3 TUa) X's Dilution, acute					
WLA _c			1	Instream criterion (1.0 TUc) X's Dilution, chronic					
WLA _{a,c}			3	ACR X's WLA _a - converts acute WLA to chronic units					
ACR -acute/chronic ratio			10	LC50/NOEC (Default is 10 - if data are available, use tables Page 3)					
CV-Coefficient of variation			0.6	Default of 0.6 - if data are available, use tables Page 2)					
Constants eA			0.4109447	Default = 0.41					
eB			0.6010373	Default = 0.60					
eC			2.4334175	Default = 2.43					
eD			2.4334175	Default = 2.43 (1 samp) No. of sample 1					
				**The Maximum Daily Limit is calculated from the lowest LTA, X's eC. The LTA _{a,c} and MDL using it are driven by the ACR.					
LTA _{a,c}			1.2328341	WLA _{a,c} X's eA					
LTA _c			0.6010373	WLA _c X's eB					
MDL** with LTA _{a,c}			3.000000074	TU _c	NOEC =	33.333333	(Protects from acute/chronic toxicity)		
MDL** with LTA _c			1.462574684	TU _c	NOEC =	68.372577	(Protects from chronic toxicity)		
AML with lowest LTA			1.462574684	TU _c	NOEC =	68.372577	Lowest LTA X's eD		
IF ONLY ACUTE ENDPOINT/LIMIT IS NEEDED, CONVERT MDL FROM TU _c to TU _a									
MDL with LTA _{a,c}			0.300000007	TU _a	LC50 =	333.333325 %	Use NOAEC=100%		Rounded NOEC's %
MDL with LTA _c			0.146257468	TU _a	LC50 =	683.725769 %	Use NOAEC=100%		LC50 = NA %

CHRONIC DILUTION SERIES TO RECOMMEND				
	Monitoring		Limit	
	% Effluent	TUc	% Effluent	TUc
Dilution series based on data mean	100	1.000000		
Dilution series to use for limit			64	1.56
Dilution factor to recommend:	0.5		0.8	
Dilution series to recommend:	100.0	1.00	100.0	1.00
	50.0	2.00	80.0	1.25
	25.0	4.00	64.0	1.56
	12.5	8.00	51.2	1.95
	6.3	16.00	41.0	2.44
Extra dilutions if needed	3.12	32.05	32.77	3.05
	1.56	64.10	26.21	3.81

Fact Sheet – VPDES Permit No. VA0024732 – Massanutten PSC STP

BIOSOLIDS LIMITATIONS AND MONITORING REQUIREMENTS

Metals Limitations & Monitoring

PARAMETER ⁽¹⁾	BASIS FOR LIMITS	LIMITATIONS		MONITORING REQUIREMENTS	
		Monthly Average (mg/kg) ⁽¹⁾⁽²⁾⁽³⁾	Maximum (mg/kg) ⁽¹⁾⁽²⁾⁽⁴⁾	Frequency ⁽⁵⁾	Sample Type
Arsenic	1	41	75	1/Year	Composite
Cadmium	1	39	85	1/Year	Composite
Copper	1	1,500	4,300	1/Year	Composite
Lead	1	300	840	1/Year	Composite
Mercury	1	17	57	1/Year	Composite
Molybdenum	1	NL ⁽⁶⁾	75	1/Year	Composite
Nickel	1	420	420	1/Year	Composite
Selenium	1	100	100	1/Year	Composite
Zinc	1	2,800	7,500	1/Year	Composite

NL = No Limit, monitoring required

1/Year = Sampling each calendar year with the results submitted by February 19th of each year

- (1) All parameters are subject to pollutant concentrations (PC), cumulative pollutant loading rates (CPLR), and ceiling limits. PC biosolids contain the constituents identified above at concentrations below the monthly average specified in Part IV.A.2. CPLR biosolids contain the constituents identified above at concentrations above the monthly average and each sample must be below the ceiling limitations specified in Part IV.A.2.
- (2) All limits and criteria are expressed on a dry weight basis.
- (3) Monthly average shall be reported as the average of the results of all samples collected within a calendar month and analyzed using an approved method, in accordance with Part II.A.1-2 of the permit. For monitoring periods which include multiple months, if one sample is collected during the monitoring period, that result shall be reported as the monthly average. If samples are collected in multiple months during the monitoring period, a monthly average shall be calculated for each month in which samples were collected during the monitoring period and the highest monthly average reported. Individual results and calculations shall be submitted with the report.
- (4) The maximum concentration shall be reported as the highest single result from all samples collected and analyzed during a monitoring period.
- (5) The monitoring frequency of 1/Year is based on less than 290 metric tons of biosolids being land applied annually (9VAC25-31-570). The monitoring frequency may be increased during this permit term if DEQ deems it necessary.
- (6) The monthly average concentration for molybdenum is currently under study by USEPA. Research suggests that a monthly average molybdenum concentration below 40 mg/kg may be appropriate to reduce the risk of copper deficiency in grazing animals.

Bases for Limitations

1. VPDES Permit Regulation (9VAC25-31)

Fact Sheet – VPDES Permit No. VA0024732 – Massanutten PSC STP

Pathogen Reduction Requirements

BASIS FOR LIMITS	PATHOGEN REDUCTION ALTERNATIVE	PROCESS TO SIGNIFICANTLY REDUCE PATHOGENS (PSRP) OPTION	CLASS B PATHOGEN REDUCTION TREATMENT STANDARDS	MONITORING REQUIREMENTS ⁽¹⁾
1,2	1	NA	Fecal coliform monitoring: <2,000,000 MPN/gm or <2,000,000 CFU/gm, geometric mean of 7 samples (9VAC25-32-675.B.2)	1/Year ⁽²⁾
1,2	2	1	PSRP: Aerobic Digestion: Sludge mean cell residence time from 40 days at 20°C to 60 days at 15°C (9VAC25-32-675.D.1)	(3)
1,2	2	2	PSRP: Air dry in a drying bed for three months. Ambient average daily temperature must be above 0°C for 2 of the 3 months (9VAC25-32-675.D.2)	(3)
1,2	2	3	PSRP: Anaerobic digestion for a mean cell residence time between 15 days at 35°C - 55°C up to 60 days at 20°C (9VAC25-32-675.D.3)	(3)
1,2	2	4	PSRP: Composting at 40°C or above for 5 or more days, maintaining > 55°C for 4 consecutive hours during the 5 days (9VAC25-32-675.D.4)	(3)
1,2	2	5	PSRP: Sufficient lime is added to the sewage sludge to raise the pH of the sewage sludge to 12 after two hours of contact (9VAC25-32-675.D.5)	(3)
1,2	3	PROCESS AS APPROVED	Process equivalent to PSRP: PROCESS AS APPROVED (9VAC25-32-675 B.4.)	(3)

NA = Not applicable

1/Year = Sampling each calendar year with the results submitted by February 19th of each year

- (1) The monitoring frequency of 1/Year is based on less than 290 metric tons of biosolids being land applied annually (9VAC25-31-570). The monitoring frequency may be increased during this permit term if DEQ deems it necessary.
- (2) Between sampling events, operating records must demonstrate that the treatment facility is operating at a performance level known to meet pathogen reduction standards.
- (3) Process monitoring must be sufficient to demonstrate compliance with PSRP treatment requirements.

Bases for Requirements

1. VPDES Permit Regulation (9VAC25-31-710)
2. Environmental Regulations and Technology - Control of Pathogens and Vector Attraction Reduction in Sewage Sludge (EPA/625/R-92/013)

Fact Sheet – VPDES Permit No. VA0024732 – Massanutten PSC STP

Vector Attraction Reduction (VAR) Requirements

BASIS FOR LIMITS	VAR OPTION	VAR TREATMENT STANDARD	MONITORING REQUIREMENTS ⁽¹⁾
1,2	1	38% Reduction of volatile solids by digestion (9VAC25-32-685.B.1)	1/Year ⁽²⁾⁽³⁾
1,2	2	When 38% reduction is not achieved by anaerobic digestion, 40 day bench study at temperatures between 30°C and 37°C to demonstrate further reduction of volatile solids <17% (9VAC25-32-685.B.2)	1/Year ⁽²⁾⁽³⁾
1,2	3	When 38% reduction is not achieved by aerobic digestion, 30 day bench study at 20°C to demonstrate further reduction of volatile solids <15% (9VAC25-32-685.B.3)	1/Year ⁽²⁾⁽³⁾
1,2	4	Specific Oxygen Uptake Rate of ≤ 1.5 mg O ₂ /hour/gram total solids at 20°C (aerobically processes sludge) (9VAC25-32-685.B.4)	1/Year ⁽²⁾⁽³⁾
1,2	5	14 day aerobic process, temperatures above 40°C with an average temperature of >45°C (9VAC25-32-685.B.5)	(3)
1,2	6	Sufficient alkali is added to the sewage sludge to raise the pH of the sewage sludge to 12 S.U. or higher, and without the addition of more alkali, maintain the pH at 12 S.U. for two hours and then at 11.5 S.U. or higher for an additional 22 hours (9VAC25-32-685.B.6)	(3)
1,2	7	Where biosolids do not contain unstabilized solids from primary wastewater treatment, the percent solids of the biosolids shall be ≥ 75% (9VAC25-32-685.B.7)	1/Year ⁽²⁾⁽³⁾
1,2	8	Where biosolids contain unstabilized solids from primary wastewater treatment, the percent solids of the biosolids shall be ≥ 90% (9VAC25-32-685.B.8)	1/Year ⁽²⁾⁽³⁾
1,2	9	Sewage Sludge shall be injected below the surface of the land (9VAC25-32-685.B.9)	NA ⁽⁴⁾
1,2	10	Sewage sludge land applied shall be incorporated into the soil within 6 hours after application (9VAC25-32-685.B.10)	NA ⁽⁴⁾

NA = Not applicable

1/Year = Sampling each calendar year with the results submitted by February 19th of each year

- (1) The monitoring frequency of 1/Year is based on less than 290 metric tons of biosolids being land applied annually (9VAC25-31-570). The monitoring frequency may be increased during this permit term if DEQ deems it necessary.
- (2) Between sampling events, operating records must demonstrate that the treatment facility is operating at a performance level known to meet VAR standards.
- (3) Process monitoring must be sufficient to demonstrate compliance with VAR treatment requirements.
- (4) If the selected VAR option 1- 8 is not met, the permittee shall provide notification to the land applier at the time the biosolids are delivered that the biosolids did not meet VAR at the treatment facility and that the biosolids must be injected or incorporated. The permittee shall obtain verification from the land applier that injection or incorporation occurred.

Bases for Requirements

1. VPDES Permit Regulation (9VAC25-31-720)
2. Environmental Regulations and Technology - Control of Pathogens and Vector Attraction Reduction in Sewage Sludge (EPA/625/R-92/013)

APPENDIX C

BASES FOR PERMIT SPECIAL CONDITIONS

Tabulated below are the sections of the permit, with any changes and the reasons for the changes identified. Also provided is the basis for each of the permit special conditions.

Cover Page	Content and format as prescribed by the Guidance Memo No. 14-2003.
Part I.A.1	<p>Effluent Limitations and Monitoring Requirements: Bases for effluent limits are provided in previous pages of this fact sheet. Monitoring requirements are as prescribed by Guidance Memo No. 14-2003. <i>Updates Part I.A.1 of the previous permit with the following:</i></p> <ul style="list-style-type: none"> • Minor changes were made to the format and introductory language. • Less stringent annual limits for Ammonia-N were included and year round limits applied instead of seasonal limits. • Total Phosphorus and Total Nitrogen monitoring and limits were included along with a footnote that references interim limits and a schedule of compliance. • A footnote was added indicating that Total Nitrogen and Total Phosphorus load limits are included in the current Registration List for the General VPDES Watershed Permit Regulation.
Part I.A.2	<p>Effluent Limitations and Monitoring Requirements: Bases for effluent limits are provided in previous pages of this fact sheet. Monitoring requirements are as prescribed by Guidance Memo No. 14-2003. <i>Updates Part I.A.2 of the previous permit with the following:</i></p> <ul style="list-style-type: none"> • Minor changes were made to the format and introductory language. • Less stringent annual limits for Ammonia-N were included and year round limits applied instead of seasonal limits. • Total Phosphorus and Total Nitrogen monitoring and limits were included along with a footnote that references interim limits and a schedule of compliance. • A footnote was added indicating that Total Nitrogen and Total Phosphorus load limits are included in the current Registration List for the General VPDES Watershed Permit Regulation.
Part I.A.3	<p>Effluent Limitations and Monitoring Requirements: Bases for effluent limits are provided in previous pages of this fact sheet. Monitoring requirements are as prescribed by Guidance Memo No. 14-2003. <i>Updates Part I.A.3 of the previous permit with the following:</i></p> <ul style="list-style-type: none"> • Minor changes were made to the format and introductory language. • Less stringent annual limits for Ammonia-N were included and year round limits applied instead of seasonal limits. • More stringent concentration and mass limits for TSS were included and the 85% removal footnote was removed. • The monitoring frequency for E. coli was increased from 3 Days/Week to 5/Week based on Guidance Memo No. 14-2003. • A more stringent Total Phosphorus – Calendar Year limit was included. • Monitoring for TP, TKN, Nitrite-N + Nitrate-N, and TN and associated footnotes were removed as they are reported under the nutrient general permit.

Fact Sheet – VPDES Permit No. VA0024732 – Massanutten PSC STP

Part I.B	Total Residual Chlorine (TRC) and E. coli Limitations and Monitoring Requirements: <i>Updates Part I.B of the previous permit with more stringent effluent limits minor wording changes and changes to the monitoring frequency for bacteria.</i> Specifies both disinfection and effluent limits and monitoring requirements should the permittee elect to switch from alternate disinfection to chlorine disinfection. Required by Sewage Collection and Treatment (SCAT) Regulations and 9VAC25-260-170, Bacteria; other waters. Also, 40 CFR 122.41(e) requires the permittee, at all times, to properly operate and maintain all facilities and systems of treatment in order to comply with the permit. This ensures proper operation of chlorination equipment to maintain adequate disinfection.
Part I.C	Effluent Limitations and Monitoring Requirements – Additional Instructions: <i>Updates Part I.C of the previous permit with minor wording changes. Also, the QL for CBOD₅ was changed from 5 mg/L to 2 mg/L.</i> Authorized by VPDES Permit Regulation 9 VAC25-31-190 J.4 and 220.I. This condition is necessary when pollutants are monitored by the permittee and a maximum level of quantification and/or a specific analytical method is required in order to assess compliance with a permit limit or to compare effluent quality with a numeric criterion. The condition also establishes protocols for calculation of reported values. §62.1 44.19:13 of the Code of Virginia defines how annual nutrient loads are to be calculated; this is carried forward in 9VAC25-820-70. As annual concentrations (as opposed to loads) are limited in the individual permit, this special condition is intended to reconcile the reporting calculations between the permit programs, as the permittee is collecting a single set of samples for the purpose of ascertaining compliance with two permits.
Part I.D.	Whole Effluent Toxicity (WET) Requirements: <i>Updates Part I.D of the previous permit with minor wording changes.</i> VPDES Permit Regulation 9VAC25-31-210 and 220.I, requires monitoring in the permit to assure compliance with all applicable requirements of the State Water Control Law and the Clean Water Act. Monitoring requirements are as prescribed by Guidance Memo No. 00-2012.
Part I.E.1	95% Capacity Reopener: <i>Updates Part I.E.1 of the previous permit with minor wording changes.</i> Required by VPDES Permit Regulation 9VAC25-31-200 B 4 for Publicly Owned Treatment Works (POTW) and Privately Owned Treatment Works (PVOTW) permits.
Part I.E.2	Indirect Dischargers: <i>Identical to Part I.E.2 of the previous permit.</i> Required by VPDES Permit Regulation 9VAC25-31-200.B.1 and B.2 for Publicly Owned Treatment Works (POTW) and Privately Owned Treatment Works (PVOTW) that receive waste from someone other than the owner of the treatment works.
Part I.E.3	Materials Handling/Storage: <i>Updates Part I.E.3 of the previous permit with minor wording changes.</i> 9VAC25-31-50.A prohibits the discharge of any waste into State waters unless authorized by permit. Code of Virginia §62.1-44.16 and §62.1-44.17 authorizes the Board to regulate the discharge of industrial waste or other waste.
Part I.E.4	O&M Manual Requirement: <i>Updates Part I.E.4 of the previous permit with changes to what is required to be included in the O&M Manual.</i> Required by Code of Virginia Section 62.1-44.19, Sewage Collection and Treatment (SCAT) Regulations 9VAC25-790, and VPDES Permit Regulation 9VAC25-31-190.E for all STPs.
Part I.E.5	CTC/CTO Requirement: <i>Identical to Part I.E.5 of the previous permit.</i> Required by Code of Virginia 62.1-44.19, Sewage Collection and Treatment (SCAT) Regulations 9VAC25-790, and VPDES Permit Regulation 9VAC25-31-190.E for all STPs.
Part I.E.6	Licensed Operator Requirement: <i>Updates Part I.E.7 of the previous permit with minor wording changes.</i> The VPDES Permit Regulation 9VAC25-31-200.C, the Code of Virginia 54.1-2300 et seq., and Board for Waterworks and Wastewater Works Operators and Onsite Sewage System Professionals Regulations (18VAC160-20-10 et seq.), require licensure of operators. A class II license is indicated for this facility.

Fact Sheet – VPDES Permit No. VA0024732 – Massanutten PSC STP

Part I.E.7	Reliability Class: <i>Identical to Part I.E.8 of the previous permit.</i> Required by Sewage Collection and Treatment (SCAT) Regulations 9VAC25-790 for all municipal facilities.
Part I.E.8	Water Quality Criteria Monitoring: <i>Updates Part I.E.9 and Part I.E.10 of the previous permit with minor wording changes and different parameters required to be monitored.</i> State Water Control Law Section 62.1-44.21 authorizes the Board to request information needed to determine the discharge's impact on State waters. States are required to review data on discharges to identify actual or potential toxicity problems, or the attainment of water quality goals, according to 40 CFR Part 131, Water Quality Standards, Subpart 131.11. To ensure that water quality standards are maintained, the permittee is required to analyze the facility's effluent for the substances noted in Attachment A of this VPDES permit.
Part I.E.9	Treatment Works Closure Plan. <i>Updates Part I.E.11 of the previous permit with minor wording changes.</i> This condition establishes the requirement to submit a closure plan for the treatment works if the treatment facility is being replaced or is expected to close. This is necessary to ensure industrial sites and treatment works are properly closed so that the risk of untreated waste water discharge, spills, leaks and exposure to raw materials is eliminated and water quality maintained. Section 62.1-44.21 requires every owner to furnish when requested plans, specification, and other pertinent information as may be necessary to determine the effect of the wastes from his discharge on the quality of state waters, or such other information as may be necessary to accomplish the purposes of the State Water Control Law.
Part I.E.10	Reopeners: <i>a. Identical to Part I.E.12.a of the previous permit.</i> Section 303(d) of the Clean Water Act requires that total maximum daily loads (TMDLs) be developed for streams listed as impaired. This special condition is to allow the permit to be reopened if necessary to bring it into compliance with any applicable TMDL approved for the receiving stream. The reopener recognizes that, according to section 402(o)(1) of the Clean Water Act, limits and/or conditions may be either more or less stringent than those contained in this permit. Specifically, they can be relaxed if they are the result of a TMDL, basin plan, or other wasteload allocation prepared under section 303 of the Act. <i>b. Updates Part I.E.12.b of the previous permit with minor wording changes.</i> 9VAC25-40-70.A authorizes DEQ to include technology-based annual concentration limits in the permits of facilities that have installed nutrient control equipment, whether by new construction, expansion or upgrade. <i>c. Updates Part I.E.12.c of the previous permit with minor wording changes.</i> 9VAC25-31-390.A authorizes DEQ to modify VPDES permits to promulgate amended water quality standards.
Part I.E.11	Suspension of concentration limits for E3/E4 facilities: <i>Updates Part I.E.13 of the previous permit with minor wording changes.</i> 9VAC25-40-70.B authorizes DEQ to approve an alternate compliance method to the technology-based effluent concentration limitations as required by subsection A of this section. Such alternate compliance method shall be incorporated into the permit of an Exemplary Environmental Enterprise (E3) facility or an Extraordinary Environmental Enterprise (E4) facility to allow the suspension of applicable technology-based effluent concentration limitations during the period the E3 or E4 facility has a fully implemented environmental management system that includes operation of installed nutrient removal technologies at the treatment efficiency levels for which they were designed.
Part I.E.12	Stormwater Management: <i>New requirement.</i> VPDES Permit Regulation 9VAC25-31-10 defines discharges of stormwater from municipal treatment plants with design flow of 1.0 MGD or more, or plants with approved pretreatment programs, as discharges of stormwater associated with industrial activity. 9VAC25-31-120 requires a permit for these discharges.

Fact Sheet – VPDES Permit No. VA0024732 – Massanutten PSC STP

Part I.F	Schedule of Compliance and Interim Limits: <i>New Requirement.</i> 9VAC25-31-250 allows for schedules of compliance, when appropriate, which will lead to compliance with the Clean Water Act, the State Water Control Law and regulations promulgated under them.
Part II	Conditions Applicable to All VPDES Permits: <i>Updates Part II of the previous permit.</i> VPDES Permit Regulation 9VAC25-31-190 requires all VPDES permits to contain or specifically cite the conditions listed.
Part III.A.1	Annual Production Monitoring: <i>New requirement.</i> 9VAC25-31.220.I.4 specifies that each permit shall include monitoring requirements for sewage sludge to assure compliance with permit limits.
Part III.A.2	Metals Limitations & Monitoring: <i>New requirement.</i> Bases for limits and monitoring requirements provided in Appendix B of this fact sheet.
Part III.A.3	Pathogen Reduction Requirements: <i>Updates Part I.E.6.b of the previous permit with more detailed information on the pathogen reduction requirements.</i> Bases for requirements provided in Appendix B of this fact sheet.
Part III.A.4	VAR Requirements: <i>Updates Part I.E.6.b of the previous permit with more detailed information on the VAR requirements.</i> Bases for requirements provided in Appendix B of this fact sheet.
Part III.B.1	Approved Sources of Biosolids: <i>New Requirement.</i> 9VAC25-32-440.D states, “No person shall land apply, market, or distribute biosolids in Virginia unless the biosolids source has been approved by the board.” 9VAC25-32-510.B and C require sewage sludge to be treated to meet biosolids standards prior to delivery to the land application site.
Part IV.B.2	Annual Report: <i>New requirement.</i> 9VAC25-31-590.A requires the submittal of an annual report postmarked by February 19 for the previous year. 9VAC25-31-220.I.3. provides for the VPDES permit to require monitoring the volume of biosolids and other measurements as appropriate. 9VAC25-31-590.C requires reports be maintained verifying that sludge treatment for pathogen and vector attraction reduction be maintained by the generator and owner (of the permit). 9VAC25-31-190.H. requires the permittee to submit information requested by the board, within a reasonable time, to determine compliance with the permit. Other specific information and maintenance requirements are identified in 9VAC25-20-147.A.
Part III.B.3	Recordkeeping: <i>New requirement.</i> 9VAC25-31-580 outlines record keeping requirements for biosolids. 9VAC25-31-190.J requires all records pertaining to biosolids to be maintained for 5 years, including monitoring information, copies of all reports required by the permit and data used to develop the permit application.
Part III.B.4	Generator NANI: <i>New Requirement.</i> 9VAC25-31-530.F requires the generator of biosolids who provides biosolids to a land applier, to give notice and necessary information to the land applier. 9VAC25-31-480 states that the preparer of biosolids shall ensure that the applicable requirements in 9VAC25-31 Part VI are met when biosolids are land applied. 9VAC25-31-530.F requires that when the preparer of biosolids gives his biosolids to another person who prepares biosolids, the person who provides the biosolids give the person who receives the biosolids notice and necessary information to comply with 9VAC25-31 Part VI.
Part III.B.5	Biosolids Management Plan (BSMP): <i>Updates Part I.E.6.a with changes to what is required to be included in the BSMP.</i> 9VAC25-31-485.G requires the permit holder to maintain and implement a BSMP and specifies its components. In addition to all materials submitted with permit application, which includes an Odor Control Plan (OCP), a Nutrient Management Plan (NMP) and O&M Manual are required. 9VAC25-31-485.G.3, 9VAC25-790-140 and 9VAC25-790-260 – 300 identify minimum requirements to be included in an O&M Manual. Additional requirements are included in 9VAC25-31-100.Q.12. 9VAC25-31-100.Q.6.requires Generator’s OCP and minimum content.

Fact Sheet – VPDES Permit No. VA0024732 – Massanutten PSC STP

Part III.B.6.	Reopener: <i>Identical to Part I.E.12.d of the previous permit.</i> 9VAC25-31-220.C requires inclusion of a reopener clause in the permit to authorize immediate modification of the permit to address changes to standards or requirements for the use or disposal of biosolids, industrial wastewater sludge, or septage.
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Deletions:

Part I.E.14 **Offset Requirement:** This condition has been removed since load limits will be met without the need to offset any nutrient loads